dealt with the central point of contemporary scientific interest. Critical phases occur in the evolution of knowledge of such a kind that they seem to be revolutions in thought. The new vision of the atom as an ordered system, a macrocosm of energy in microcosmic space, is one of the greatest of these stages in the history of man's conquest of Nature. Doubtless, as the president explained, the discovery was reached along many converging paths of theory and of experiment. It was even predicted, fifty years ago in a presidential address, also at an Edinburgh meeting of the association, when Kelvin summed up the program of the past and suggested the lines along which future research must move. Sir James Dewar, at a dinner given by the Royal Society of Edinburgh last Tuesday, recalled even earlier predictions. But its attainment has led to results almost overwhelming in their importance. It has reconciled physics and chemistry in a higher unity. It has given a clock by which the age of the earth may be told. It has allowed astronomers to explain the pulsations of the distant stars. It has opened up prospects of a new and inexhaustible source of power for the practical uses of mankind. The Edinburgh meeting of the British Association will long be remembered as that at which the new atomic age was made known to those outside the inner ring of science.—The London *Times*.

SCIENTIFIC BOOKS

KEEN'S SURGERY

The first six volumes of Keen's "Surgery" recorded the progress of surgery down to 1913. In the preface to the additional volumes Dr. Keen states that the general purpose is to make available the lessons of the war for the surgery of peace and to set down every worth while surgical achievement since the war; and both of these objects have been accomplished in a masterful way. The two volumes consist of a series of monographs written by authors of international reputation and comprise 1800 pages with 996 illustrations, 29 of them in color.

The editor counts it "a crowning privilege of his long life to be associated with such a distinguished company of authors." The distinguished authors also doubtless count it as an inspiring privilege to have been associated in the production of the work with such an enthusiastic student and able teacher.

In the two new volumes the names of many former contributors are absent and new names are added. There has also been some shifting of subject matter. The editor has added many footnotes of great help to the reader, and has made many cross references to statements of the different authors of the various chapters. Typographical errors are few and there is evidence of careful editing and proofreading.

Much space in the two volumes is devoted to the organization of the medical departments of the Army and Navy. The chapters by Colonel Ashford of the U. S. Army, by Captain Bell of the U. S. Navy and by Lieut. Commander Stephens of the British Navy occupy 183 pages, including many photographs, drawings, diagrams and lists of furniture and equipments. Much information is given of value in civil practise, such as the treatment of shock, burns and suffocation by fumes and smoke.

The chapter on Gas Gangrene by Sir Cuthbert Wallace is complete and most beautifully illustrated. Some qualification seems necessary for the statement it contains that "suture of the main artery is recommended as a prophylactic measure against massive gangrene."

The chapter by Cannon on Traumatic Shock, although occupying only 19 pages, is exceedingly valuable, being not only authoritative and scientific, but practical as well.

Sir William Thorburn in his contribution on Injuries of the Spine and Spinal Cord emphasizes the treatment of the patient as a primary principle. The importance of the management of the bladder for example is stressed by the remark that "the bladder holds the key to life or death for the patient." In his chapter on Injuries to the Peripheral Nerves the author fails to mention the work

on the suture of nerves by certain Americans, especially Hober, Dean Lewis and Frazier.

Military Surgery of the Vascular System by Matas is a scholarly contribution. It is a pity that much of it is in fine print. In the treatment of gunshot wounds of the large vessels Matas defends the opinion so long held by him that when possible large blood vessels should be sutured and not ligated.

Surgery of the Head, previously contributed by Cushing, has been written for Volume VIII. by Neuhoff. It is a splendid résumé of the subject but no mention is made of Frazier's method of osteoplastic repair of cranial defects.

The Relation of the Dental Surgeon to the Treatment of Fractures of the Jaw is described by Darcissae of Paris.

Chevalier Jackson's contribution upon Laryngoscopy, Bronchoscopy and Esophagoscopy is a monument to the technical achievements and teaching ability of this great man.

Surgery of the Thorax by Heuer of Baltimore is a scolarly contribution occupying 80 pages and referring to 118 literary contributions. The enormous progress made in the surgery of the thorax during the war could scarcely be recorded in less space than this. The compliment paid to one of the younger surgeons of America by including him among the list of authors is amply justified by his contribution to the system.

Crile's chapter on Surgery of the Abdomen and Pelvis is a concise one-man contribution.

There is a short chapter by Mayo and Balfour on Surgery of the Gall Bladder and the Biliary Ducts, which deals principally with injuries and repair of the hepatic ducts.

Deaver and Pfeiffer have taken the place of the lamented Murphy in discussing appendicitis. The chapter is a short statement of Deaver's personal opinions based upon the experience that this surgeon has had with the disease. It is a great comfort to learn on page 443 that he is finally converted to the belief that morphine may be useful "to induce sleep if necessary, as well as to allay anxiety." The case report on page 441 also indicates that he has seen some cases of appendictis with peritonitis in which it is wise to delay operation. His remarks on the abuse of purgatives on page 449 should be widely read by general practitioners.

The chapter on the Bladder and Ureters by Bransford Lewis is well illustrated by pictures of the many instruments devised by the author and the text of the subject is brought up to date.

Surgery of the Prostate by Hugh Young occupies 76 pages and includes a description of the operation recently devised for the cure of recto-urethral fistula.

Physiotherapy in Surgical Treatment has made enormous advances as a result of the war and has come to be thoroughly appreciated. This chapter by McKenzie is an admirable presentation of the subject in its practical value to surgeons in civil life.

Four chapters are devoted to the diagnostic and therapeutic usefulness of various biologic sera and vaccines and chemico-therapy in surgical diseases; the status of radium in surgery; the diagnostic and therapeutic uses of the X-ray; and electro-desiccation and electro-coagulation methods in surgery. It is a question if it would not be more satisfactory to include the essentials of this knowledge in their proper place in studying diseases for which they are employed rather than in separate chapters.

The Surgery of the Infectious Diseases by George E. Armstrong, is a very practical chapter. The work by Keen many years ago in calling attention to the great frequency of surgical complications during typhoid fever has been of inestimable service in saving lives through the recognition and cure of surgical complications of the disease. The recent epidemic of influenza and the experiences in the camps with epidemics of measles, mumps and pneumonia have shown the great importance of being constantly on the lookout for surgical complications of affections hitherto regarded as purely medical.

The chapters dealing with ether and nitrous oxide anæsthesia have been rewritten. Harris's supplemental chapter on local anæsthesia

is full and authoritative. Hugh Cabot still regards spinal anæsthesia as having a place in surgery.

The chapter on Poison Gas in warfare is not solely of historic interest, because surgeons on ambulances and those connected with industrial plants and chemical laboratories will find much of practical importance.

The final chapter on a most successful method of dressing an artificial anus prepared by the editor himself is in the form of a case report and is the type of literature which is of the greatest practical use to surgeons and patients.

The index of the system consists of four "keys"; first, each volume as it stands upon the shelf carries a conspicuous label of the general subject matter it contains; second, as we open the book the table of contents is quite complete; third, each volume has a separate index; and finally, the complete index of the entire eight volumes occupies 182 pages in the form of a desk volume and makes it perfectly easy for one to find any reference he may desire. STUART MCGUIRE

SPECIAL ARTICLES

A NEW GRAPHIC ANALYTIC METHOD

1. THE graphic methods which deal with a treatment of two or three variables are commonly based on a relation of the variables to a system of rectangular cartesian coordinates. If the equation is known the laws may be expressed in the customary way by the methods of analytic geometry.

If, however, we are confronted with a system of two or more equations which are so related to each other that the growth of one will influence the growth of another (in a negative and positive sense) the following method will furnish a means of expressing such movements in a concise form and in a manner well adapted for the purpose of analysis.

Suppose we have three general equations:

$$x = f(a), \quad y = f(b), \quad z = f(c),$$

where the change of a will affect x as well as y and the change of b will affect y as well as z and if further $f(a)$, $f(b)$ and $f(c)$ are quotients expressed:

$$\frac{a}{b}, \quad \frac{a}{c} \quad \text{and} \quad \frac{b}{c};$$

we have then:

$$x = \frac{a}{b}; \quad y = \frac{a}{c}; \quad z = \frac{b}{c}$$

and notice that each quotient or independent variable is related to the other independent variable by the possession of one of its algebraic members.

If a number of equations which have a relationship of this nature is brought into a system of positive coordinates as shown in Fig. 1, the four quadrants and the coordinates

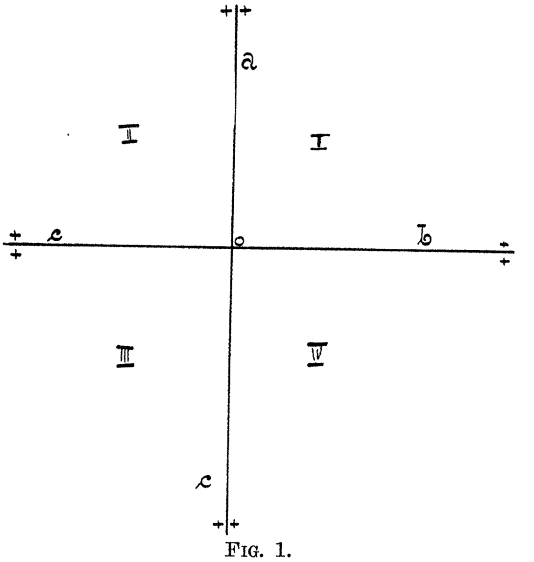

FIG. 1.

forming them may be named in the following manner:

I. Quadrant a b
II. Quadrant a c
III. Quadrant c c
IV. Quadrant c b

Therefore the ordinates of each quadrant will have two different coordinates or scale values with the exception of the third or neutral quadrant which axes have the same scale values c and are acting in a translative sense rotating the value c 90° to bring it in the third and last relationship with value b, in the fourth quadrant.